



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,931	02/07/2005	Toshimitsu Kohara	265206US0PCT	1917
22850	7590	03/10/2008		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
CHEN, BRET P				
ART UNIT		PAPER NUMBER		
1792				
NOTIFICATION DATE		DELIVERY MODE		
03/10/2008		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

### Office Action Summary

**Application No.**

10/523,931

**Applicant(s)**

KOHARA ET AL.

**Examiner**

BRET CHEN

**Art Unit**

1792

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 83-126 is/are pending in the application.
- 4a) Of the above claim(s) 111-114 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 83-110, 115-126 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

Claims 84-126 are pending in this application. Newly added claims 84-126 and canceled claims 1-83 are noted.

The amendment dated 10/18/07 has been entered and carefully considered. The examiner appreciates the amendments to the title, abstract, and claims. In view of said amendments, the objections to specification, the 112 rejection, and the art rejections have been withdrawn.

### ***Election/Restrictions***

Applicant's election of claims 84-110, 115-126 in the reply filed on 1/22/08 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**Claims 84-101, 115-126 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prizzi et al. (5,879,823) in view of Oles et al. (6,599,062).** Prizzi discloses a method of coating a cutting tool by coating a substrate 18 with a base layer 20 of titanium aluminum nitride via PVD followed by an alumina outer layer 22 (col.4 lines 46-61 and Figure 2) wherein the preferable alumina layer comprises crystalline alpha alumina (col.7 lines 13-23). It is noted that the presence of the aluminum in the TiAlN promotes the nucleation of alumina grains in the

alumina outer coating (col.4 lines 58-61) and the layer itself has a good metallurgical bond between the substrate and the TiAlN base coating (col.4 lines 52-54). In one embodiment, these layers can be deposited by CVD (col.4 lines 42-46) and the cutting tool itself can have a rake face 12 and a flank face 14 (col.4 lines 29-33). In an embodiment, the titanium-aluminum alloy can contain zirconium, hafnium, vanadium, tantalum, and niobium (claim 4). However, the reference fails to teach oxidizing the TiAlN layer.

Oles discloses a method of depositing a titanium aluminum nitride onto a substrate via a physical vapor deposition (PVD) technique in one or more layers. It is believed that the aluminum in the coating of titanium aluminum nitride oxidizes at cutting temperatures during hard turning to produce a film of chemically inert aluminum oxide at the interface of the tool with a chip of the metal work piece produced during hard turning. This phenomenon retards reactions between the metal chip and the surfaces of the cutting tool. The presence of aluminum oxide imparts good hot hardness to the cutting tool during hard turning and also provides thermal insulation (lower heat transfer coefficient) to the cutting tool surfaces. The coating of titanium aluminum nitride is preferably about 2 to 5 micrometers thick, more preferably about 3 micrometers thick (col.3 lines 38-55).

It is noted that Oles fairly teaches the benefit of oxidizing the titanium aluminum nitride coating to provide thermal insulation to the cutting tool surface as noted above. One skilled in the art would appreciate the benefits of increasing thermal insulation in a cutting process as cutting produces damaging heat. It would have been obvious to one skilled in the art to oxidize the titanium aluminum nitride coating as taught in Oles in Prizzi's process with the expectation of obtaining increased thermal insulation.

The limitations of claims 85-87 have been addressed above.

In claim 88, the applicant requires the material to be TiAlCrN. It is noted that the reference clearly teaches containing additional Group IV, Group V, and Group VI materials as noted above. To select chromium, a Group VI material as the additional element would have been obvious with the expectation of obtaining success because Prizzi clearly teaches a Group VI material and the skilled artisan would reasonably expect that Group VI materials would have similarly.

Independent claim 89 requires the primary coating to comprise Al and one more of B, C, N, O. This limitation is taught as indicated above. The limitations of claims 89-90, 116-118 have been addressed above.

Independent claim 91 requires the primary coating to have a metal whose standard free energy of oxidation generation greater than that of aluminum. In the applicant's specification, titanium is one such metal (paragraph 44). Prizzi clearly teaches TiAlN above as well as the use of TiN as an intermediate layer (col.5 line 32). This limitations of claims 91-94 have been addressed above.

Claims 95-96 require the reduction of titanium oxide. The limitations of claims 95-96 are believed to be inherent to the oxidation step above.

Independent claim 97 requires forming at least one of a pure metal alloy of a metal nitride. This limitation is taught in the cited references.

In claim 98, the applicant requires a specific temperature. It is noted that Oles clearly teaches of oxidizing the intermediate layer. One skilled in the art would realize that the oxidation would occur at an elevated temperature for increased efficiency and that the selected

temperature would be balanced between increased efficiency and increased thermal damage. It would have been obvious to selected the claimed temperature range with the expectation of obtaining success. This issue applies to claims 115, 119.

The limitations of claims 99-101, 120-126 have been addressed above.

**Claims 102-110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prizzi et al. (5,879,823) in view of Oles et al. (6,599,062) and further in view of Sathrum et al. (5,458,754).** The combination of Prizzi and Oles teaches a method of coating a cutting tool by coating a substrate with titanium aluminum nitride via PVD, oxidizing the TiAlN layer, and depositing a crystalline alpha alumina outer layer as noted above. However, the reference fails to teach gas ion bombardment (claim 102) or metal ion bombardment (claim 107).

Sathrum teaches that physical vapor deposition can be done by a number of techniques including ion bombardment to generate the plasma (col.2 lines 26-33) to deposit a wear-resistant coating on a cutting tool (col.1 lines 46-59). A substrate bias voltage can be applied (col.9 lines 42-47) and a voltage can be applied to generate the plasma (col.15 lines 49-64). It is noted that Prizzi and Oles specifically teach a PVD process but remains silent as to which PVD process is utilized. Sathrum clearly teaches that ion bombardment can be utilized as a preferred PVD process to deposit a wear-resistant coating. It would have been obvious to utilize an ion bombardment process for the PVD process of Prizzi and Oles with the expectation of success because Sathrum teaches the successful deposition utilizing ion bombardment.

The limitations of claims 103-106 and 108-110 have been addressed above.

***Response to Arguments***

Applicant's arguments with respect to claims above have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 1792

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRET CHEN whose telephone number is (571)272-1417. The examiner can normally be reached on 7:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. Chen/

Primary Examiner, Art Unit 1792

2/26/08